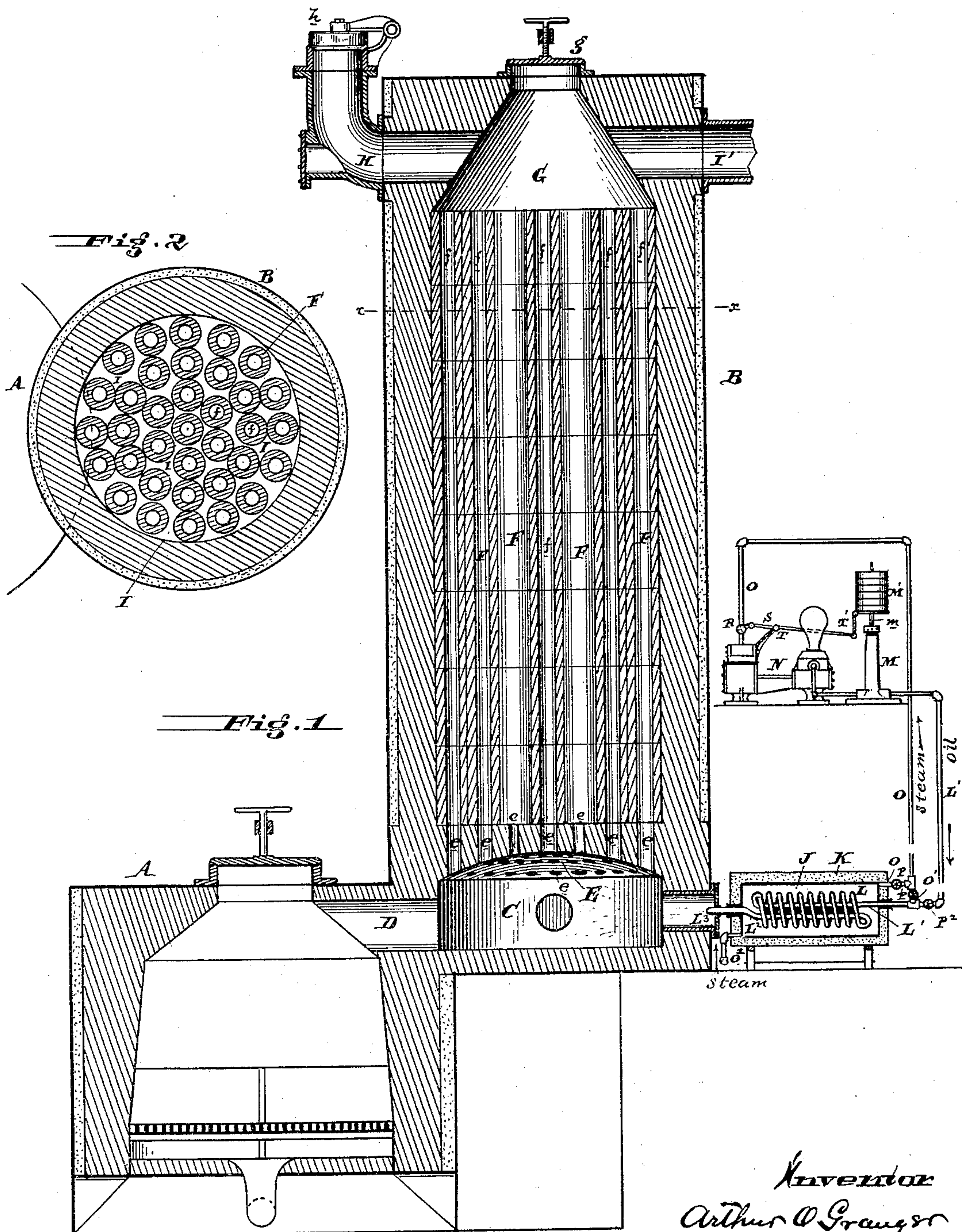


(No Model.)

A. O. GRANGER.
GAS GENERATING APPARATUS.

No. 318,106.

Patented May 19, 1885.



Attest
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UNITED STATES PATENT OFFICE.

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GAS-GENERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 318,106, dated May 19, 1885.

Application filed December 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR O. GRANGER, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Gas-Generating Apparatus, of which the following is a specification.

My invention has reference to gas apparatus, but particularly to the construction of the superheater and the hydrocarbon-supply apparatus; and it consists in certain improvements fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof. Carbureted water-gas is now extensively produced by spraying under pressure crude oil or naphtha into previously produced water-gas in a heated fixing-chamber, as set forth in Letters Patent numbered 276,562 and 287,277, respectively, dated May 1, 1883, and October 23, 1883.

My improvement consists in a heater placed between the pump or means of producing the pressure on the oil and the nozzle from which it is sprayed, for the purpose of highly heating the said oil before it is subdivided or sprayed, to the end that it shall be more readily and thoroughly volatilized. I prefer to construct a heater of a cylinder preferably covered with a non-conducting covering and inclosing a strong coil of pipe of helical shape, through which the oil is caused to flow in passing to the spraying-nozzle within the superheater. Steam is allowed to flow through said cylinder and around the said coils, and then may be conveyed to the steam-pump, which produces the pressure in the oil, the result of which heating of the oil before being sprayed being a more perfect vaporization, and the better maintenance of the heat of the fixing-chamber or superheater, all of which tends to increase the quantity of the gas and economy in its production. The heater-coils are supported within the steam cylinder or chamber, and preferably do not touch the walls or sides of same, thereby allowing the steam to fully circulate about said coils, and this casing or cylinder is preferably covered with a non-conductor of heat.

Many attempts have been made to find a filling for the superheater or fixing-chamber that will not clog up and can be readily cleaned

should a stoppage take place. To accomplish this I make a series of cylindrical fire-brick and place them end to end vertically, so that they form a series of straight flues, not only by means of the holes in the center of the bricks, but also by the spaces between the cylinders. In this way I obtain the necessary material for absorbing the heat and then giving it off by radiation, and so fixing the gas as it passes through the flues without holding it so long in contact with the heated brick-work as to injure the illuminating-power of the gas, which invariably resulted with the old forms of filling in the superheater applied to water-gas apparatus; and the flues being straight it is easy to clean them with a suitable scraper without removing them from the fixing-chamber. The filling or fixing brick will thus last very much longer and the quality of the gas be increased, while the cost of the manufacture will be reduced.

My invention further consists in many other details of construction, all of which are fully set forth in the following specification and shown in the accompanying drawings, which form part thereof.

In the drawings, Figure 1 is a sectional elevation of gas apparatus embodying my invention; and Fig. 2 is a sectional plan through the superheater on a line *x x*.

A is a generator, which may be of any ordinary construction.

B is the superheater, and consists of a sheet-iron shell lined with fire-brick, having a combustion-chamber, C, at the bottom, which opens into the generator by a flue, D, and is covered by a roof or arch, E, provided with numerous holes or apertures *e*. The chamber G above said arch is filled with the tubes F, having vertical cylindrical holes or apertures *f*, and said tubes are made of fire-brick sections and are set end to end to form continuous vertical flues and also continuous vertical passages I, constituting the spaces surrounding and interposed between said flues. These flues and spaces surrounding them open into the combustion-chamber C by the passages *e*.

H is the smoke-outlet from the top of the superheater, and is provided with the chimney-valve *h*.

g is a cleaning-door arranged on top of the superheater and opens into the chamber *G* above the flues, which chamber at this point is preferably made conical.

5 *I'* is the gas-outlet from the top of the superheater and connects with the washer or purifying apparatus, and from which the gas is conveyed to the holder.

The heater for the oil is constructed as follows: *J* is a cylinder, preferably of sheet-iron, and covered by a non-conductor, *K*, and through which steam is passed by pipes *O*² and *O* to steam-pump *N*, and the supply which passes through said cylinder may be shut off, 10 when desired, by a valve, *P*. *L* is a coil of pipe supported within said cylinder *J*, and preferably without touching its walls, and into said coil the oil is fed by a pipe, *L'*, which preferably passes through the coil and unites 20 with the same at the end next to the discharge-nozzle, while the outlet for the vaporized oil connects with the other end of said coil and passes through the coil in the opposite direction, as indicated by *L*², and terminates in the 25 spraying-nozzle *L*³. The steam-pump *N* is adapted to force oil into the pipe *L'*, from which it passes to the heater, and its pressure is kept constant by a regulator, *M*, which consists of a cylinder into which the plunger *m* works and is forced therein by weights *M'*. This regulator, through the agency of the link *T'* and lever *T*, pivoted at *S*, automatically operates the valve *R*, which controls the supply of steam to the pump. 35 This apparatus is fully described in the Letters Patent hereinbefore referred to, therefore I make no special claim thereto. The oil-pipe *L'* is connected with the steam-pipe *O* and the passage controlled by a valve, *P'*, and 40 said pipe *L'* is also provided with a valve, *P*², located between the regulator or oil-supply and the connection of said pipe with pipe *O*. The object of these valve-connections is to enable steam to be blown through the heating- 45 coils whenever desired for the purpose of cleaning the same, of course at which time the oil-supply must be shut off. The oil is forced through the heating-coils *L* under great pressure, and being therein vaporized is sprayed 50 from the nozzle *L*³ in the finest possible condition or subdivision, and in such a heated condition as to require little or none of the heat of the superheater to complete its conversion into a gas. The water-gas which has 55 been generated in the superheater in the usual manner, by treating red-hot carbon with steam, is conducted by flue *D* into the cham-

ber *C* of the superheater, where it commingles with the volatilized oil or hydrocarbon, and the mixture thus produced passes up the flues 60 or passages *f* and *I* and becomes fixed with the least possible extraction of heat from the superheater.

I do not limit myself to the particular construction of oil-vaporizing heater shown, as it 65 may be modified in various ways without departing from my invention; neither is it essential to my invention that the flues *F* should be cylindrical; but I prefer that construction as being the simplest and cheapest. 70

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A superheater for gas apparatus, consisting of a fire-brick chamber filled with vertical 75 tubes of fire-brick up through and between which the water-gas passes, and a supporting-arch having openings or passages connecting with the flues and intertubular spaces, in combination with a gas-generator, substantially 80 as and for the purpose specified.

2. A superheater having a roofed combustion-chamber at the bottom and its body filled with vertical tubes of fire-brick, through and 85 between which the water-gas passes, the said roof of the combustion-chamber being provided with holes or apertures connecting with the flues and the intertubular spaces between them, substantially as and for the purpose 90 specified.

3. The combination of a superheater of a gas apparatus with the oil-nozzle *L*³, coils *L*, cylinder *J*, and steam-pipes to conduct steam 95 through said cylinder, substantially as and for the purpose specified.

4. The combination of a superheater of a gas apparatus with the oil-nozzle *L*³, coils *L*, pipes *O* *L'*, and steam-pump *N*, substantially 100 as and for the purpose specified.

5. The combination of a superheater of a gas apparatus with the oil-nozzle *L*³, coils *L*, pipes *O* *L'*, steam-pump *N*, and a regulator, 105 substantially as and for the purpose specified.

6. The combination of a superheater of a gas apparatus with the oil-nozzle *L*³, coils *L*, pipes *O* *L'*, valves *O'* *P*², and a connection between pipes *O* and *L'*, substantially as and for 110 the purpose specified.

In testimony of which invention I hereunto set my hand.

A. O. GRANGER.

Witnesses:

R. M. HUNTER,
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